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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,487

07/20/2006

Kousuke Chiba

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10/15/2008

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WASHINGTON, DC 20006-1021

EXAMINER

BARRY, CHESTER T

ART UNIT

PAPER NUMBER

1797

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DELIVERY MODE

10/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,487	Applicant(s) CHIBA, KOUSUKE	
	Examiner CHESTER T. BARRY	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/20/06</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Examiner-annotated copies of Bebin, Bernard, and Christodoulatos.</u> |

The disclosure is objected to because of the following informalities: At page 4, line 15, "necessitate" is misspelled. Based on page 9 lines 4-5 of PCT/JP2004/003874,¹ it appears that page 10 line 17 should read "3.0 μm ". At page 14 line 3, was "At the spot . . ." intended? Based on page 11 line 22 of PCT/JP2004/003874, it appears that page 14 line 10 should read "300 μm ". At page 16 line 3, "time the volume. . ." should be "times the volume. . ." At page 17 line 5, "to enhance" should appear as "to enhance." At page 17 line 13, "achive" should appear as "achieve." Each instance of "Patent Document [x]" after paragraph [0018], where x is an element of {1,2,3,4,5}, should be replaced by the corresponding document number found at [0014] – [0018]. Appropriate correction is required.

Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See page 11 line 13. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

¹

気液ミキサーを通過するに要する短時間内に、気泡径 0 . 5
5 ~ 3 . 0 μm 程度、さらには 1 nm ~ 1 , 0 0 0 nm の超微

Claims 8 – 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Per claim 8, the phrase, "the decreasing rate of the concentration of the dissolved gas in the gasified liquid . . . is reduced " cannot be understood. It is unclear whether the "rate of concentration" of the gas into the liquid means the rate of dissolution of the gas from the gas phase to the liquid phase. Does applicant mean that the rate of dissolution of gas into the liquid phase decreases less quickly? If so, less quickly in comparison to which prior art method? Per claims 8, 10, and 11, it is unclear whether "the pressurized state" of claim 10 refers to the "pressurized condition" of claim 8 (this is a rejection based on lack of proper antecedent basis). Per claim 8, it is unclear what "instantaneously" means in this context. The dissolution of a gas phase chemical species, e.g., oxygen gas, into a water is necessarily a time dependent event, as any number of mass transfer textbooks or treatises will attest. If applicant means "rapidly" where "instantaneously" was used, then some objective standard by which "rapidly" may be distinguished from "slowly" would be required for the skilled artisan to adequately discern the metes and bounds of the claim. It is suggested that this basis for rejection be addressed through cancellation of the adverb, "instantaneously."

Claims 8 – 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the

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invention. Although the application teaches how to dissolve oxygen into water, the application fails to teach how to do so “instantaneously.” It is well known that dissolution of a gas such as oxygen into a liquid such as water is a mass transfer operation that is time-dependent albeit a relatively fast one under appropriate circumstances. See, for example, Hirota, et al, “Magnetic field effect on the kinetics of oxygen dissolution into water,” Materials Transactions, 2000, vol. 41, n° 8, pp. 976-980, or Chen, at Fig. 5 and related text.

Claims 8 – 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Christodoulatos. USP 6752926 to Christodoulatos describes a process in which oxygen is instantaneously² dissolved in a recirculated wastewater line by means of a line atomizer, e.g., porous membrane 34 (col 8 line 21), under pressurization (Abstract), in advance and outside, i.e., upstream of and separate from, respectively, bioreactor reaction vessel 24. The reference implicitly admits that some oxygen bubbles are formed because it states that the formation of oxygen bubbles is minimized (Abstract) rather than prevented or eliminated. Alternatively, the skilled artisan would have understood that some air bubbles pass through the membrane in the embodiment in which the membrane is a porous one. Moreover, even in the case of a non-porous membrane, fine bubbles of oxygen would develop in the oxygenated water because there is a 2 – 4 psi pressure drop between the exit of the line atomizer 34 and the entrance to the bioreactor 24 (col 10 line 31). The skilled artisan would have understood that a portion of the oxygen that would be dissolved at the higher pressure

² “high rate of oxygen transfer” (Abstract)

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of the oxygenator would necessarily come out of solution in the form of fine bubbles as the pressure dropped those 2 – 4 psi. See for example col 3 line 55 at USP 4192742 to Bernard. Accordingly, the fluid that is admitted from the recirculation line to the lower right portion of the bioreactor reaction vessel 24 (as it appears in Fig. 3) would be a gasified solution introduced into the reaction vessel. The vessel is maintained in a pressurized condition. Per claim 9, the bioreactor includes packing for supporting biological organisms. Inherently, such packing meets the claim-recited functional limitations of increased habitat density, microorganism holding, and microorganism retention. Per claims 10 - 11, the degree of the pressurized state in the bioreactor, i.e., 20 psi, (Table 1) does not exceed the pressure at the outlet of the line atomizer, i.e., 22 – 24 psi.

Art cited of interest: USP 3928190 to Bébin describes a microorganism-supporting packed bed bioreactor receiving oxygenated water from an upstream outside line atomizer, but the bioreactor appears to be at ambient rather than elevated pressure. Other art cited of interest is found at: 7105092 5961830 5728305 5316682 5151187 4921604 4749527 4009105 4009099 3968035.

/Chester T. Barry/

Primary Examiner, Art Unit 1797

571-272-1152

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